form of an OOP object or any other data construct or mechanism sufficient to carry the requisite information between the services.

In another example, the use of "smart event" notifications obviates the conflict presented in problem scenario #1 above under the heading "New Relationship Even Received", by transmitting, from the discover engine to the manager service, a newly discovered relationship object with a notification that a SAN topology change has occurred. Similarly, other conflict scenarios listed above can be avoided by combining the transmission of a notification with the data needed to process the notification.

In a still further example, a "smart event" notification can indicate not only that a file system is overutilized but, also, can identify the respective host and the amount of degree of overutilization.

The use of smart events advantageously allows maintaining a valid representation of the SAN, e.g., a valid topology representation, without a need to "lock" data contained in a database regarding a change until a subsystem that has been notified of the change has had the opportunity to access this data. For example, subsequent to the transmission of a "smart" notification, indicative of a topology change, from the discover engine to the manager service, the discover engine database can be updated without a need to consider whether the manager service has completed handling the notification.

SAN Topology Recognition (Virtual SANs)

As discussed above, according to one practice of the invention, SAN manager 20 receives inband and outband data from scanners associated with hosts, and collates the data to generate a topological representation of the SAN. Each host is connected, via one or more adapters and via interconnect fabric 16, to one or more storage devices. The agent associated with each host utilizes the host's adapter to determine the SAN elements, e.g., storage devices, with which each adapter can communicate, i.e., the elements that the adapter can "see," all as discussed above.

The information gathered by one host adapter is typically not indicative of all elements, e.g., storage devices, of the SAN to which the host has access. This is because communications between the adapter to any given storage device may be restricted by switches or switch-like interfaces on the interconnect, the storage devices and or the hosts devices themselves. As noted previously, such switches or interfaces are often employed to define "zones" within the SAN.

By way of example, FIGURE 23 illustrates a host HOST1 having two adapters ADPATER1 and ADAPTER 2. Through adapter ADAPTER1, the host can communicate, that is, it can "see", only storage devices DISK1 and DISK2 via a switch SWITCH1. In contrast, through adapter ADAPTER2, the host can communicate only with storage devices DISK2 and DISK3. Thus, the host can only "see" a subset of the storage devices, and further, the devices seen through one adapter form a different subset of the same "virtual" SAN as the devices than seen by the other adapter.

The SAN manager 20 utilizes a methodology described in more detail below to disambiguate the information gathered through the host adapters ADAPTER1 and ADAPTER2, and similar adapters on other hosts connected to the SAN, to generate a topological model of the SAN. Thus, by way of example, the SAN manager 20 can infer that the reported devices DISK1, DISK2 and DISK3 belong to the same virtual SAN because of the overlap, i.e., DISK2, between the zones (SAN regions) in which they fall.

The term "virtual SAN" is herein utilized to refer to those devices that are likely to belong the same SAN, even if they do not necessarily make up the entirety of the SAN. More particularly, a virtual SAN can be said to comprise endpoints on the interconnect – to wit, storage devices, bridges, routers hosts, and the like, --- in a set of regions, each of which has one or more common endpoints (typically, storage device ports) with at least one other region of that set. Elsewhere in this document, the term SAN includes virtual SANs, unless otherwise evident from context.

A more complex scenario than that discussed above arises when multiple adapters of a host are linked via common ports of a fabric element, e.g., a switch. For example, consider a scenario in which scans from a host indicate that its adapters see interconnect fabric switch ports P1 – P12, as follows:

Adapter A1 detects ports P1 & P2,

Adapter A2 detects ports P3 & P4,

Adapter A3 detects ports P5, P6, & P1,